CHAPTER 33-16-02.1
STANDARDS OF QUALITY FOR WATERS OF THE STATE

33-16-02.1-01. Authority. These rules are promulgated pursuant to North Dakota Century Code chapters 61-28 and 23-33; specifically, sections 61-28-04 and 23-33-05, respectively.

History: Effective June 1, 2001.
General Authority: NDCC 61-28-04
Law Implemented: NDCC 23-33, 61-28

33-16-02.1-02. Purpose.

1. The purposes of this chapter are to establish a system for classifying waters of the state; provide standards of water quality for waters of the state; and protect existing and potential beneficial uses of waters of the state.

2. The state and public policy is to maintain or improve, or both, the quality of the waters of the state and to maintain and protect existing uses. Classifications and standards are established for the protection of public health and environmental resources and for the enjoyment of these waters, to ensure the propagation and well-being of resident fish, wildlife, and all biota associated or dependent upon these waters, and to safeguard social, economical, and industrial development. Waters not being put to use shall be protected for all reasonable uses for which these waters are suitable. All known and reasonable methods to control and prevent pollution of the waters of this state are required, including improvement in quality of these waters, when feasible.

   a. The "quality of the waters" shall be the quality of record existing at the time the first standards were established in 1967, or later records if these indicate an improved quality. Waters with existing quality that is higher than established standards will be maintained at the higher quality unless affirmatively demonstrated, after

full satisfaction of the intergovernmental coordination and public participation provisions of the continuing planning process, that a change in quality is necessary to accommodate important social or economic development in the area in which the waters are located. In allowing the lowering of existing quality, the department shall assure that existing uses are fully protected and that the highest statutory and regulatory requirements for all point sources and cost-effective and reasonable best management practices for nonpoint sources are achieved.

b. Waters of the state having unique or high quality characteristics that may constitute an outstanding state resource shall be maintained and protected.

c. Any public or private project or development which constitutes a source of pollution shall provide the best degree of treatment as designated by the department in the North Dakota pollutant discharge elimination system. If review of data and public input indicates any detrimental water quality changes, appropriate actions will be taken by the department following procedures approved by the environmental protection agency. (North Dakota Antidegradation Implementation Procedure, Appendix IV.)

History: Effective June 1, 2001.
General Authority: NDCC 61-28-04, 61-28-05
Law Implemented: NDCC 23-33, 61-28-04

33-16-02.1-03. Applicability. Nothing in this chapter may be construed to limit or interfere with the jurisdiction, duties, or authorities of other North Dakota state agencies.

History: Effective June 1, 2001.
General Authority: NDCC 61-28-04
Law Implemented: NDCC 23-33, 61-28

33-16-02.1-04. Definitions. The terms used in this chapter have the same meaning as in North Dakota Century Code chapter 61-28, except:

1. "Acute standard" means the one-hour average concentration does not exceed the listed concentration more than once every three years on the average.

2. "Best management practices" are methods, measures, or procedures selected by the department to control nonpoint source pollution. Best management practices include, but are not limited to, structural and nonstructural measures and operation and maintenance procedures.

3. "Chronic standard" means the four-day average concentration does not exceed the listed concentration more than once every three years on the average.

4. "Consecutive thirty-day average" is the average of samples taken during anyconsecutive thirty-day period. It is not a requirement for thirty consecutive daily samples.

5. "Department" means the North Dakota state department of health.

6. A standard defined as "dissolved" means the total quantity of a given material present in a filtered water sample, regardless of the form or nature of its occurrence.

7. "Pollution" means such contamination, or other alteration of the physical, chemical, or biological properties, of any waters of the state, including change in temperature, taste, color, turbidity, or odor. Pollution includes discharge of any liquid, gaseous, solid, radioactive, or other substance into any waters of the state that will or is likely to create a nuisance or render such waters harmful, detrimental, or injurious to public health, safety, or welfare; domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses; or livestock, wild animals, birds, fish, or other aquatic biota.

8. "Site-specific standards" mean water quality criteria developed to reflect local environmental conditions to protect the uses of a specific water body.

9. A standard defined as "total" means the entire quantity of a given material present in an unfiltered water sample regardless of the form or nature of its occurrence. This includes both dissolved and suspended forms of a substance, including the entire amount of the substance present as a constituent of the particulate material. Total recoverable is the quantity of a given material in an unfiltered aqueous sample following digestion by refluxing with hot dilute mineral acid.

10. "Water usage". The best usage for the waters shall be those uses determined to be the most consistent with present and potential uses in accordance with the economic and social development of the area. Present principal best uses are those defined in subdivisions a, b, c, and d. These are not to be construed to be the only possible usages.

    a. Municipal and domestic water. Waters suitable for use as a source of water supply for drinking and culinary purposes after treatment to a level approved by the department.

    b. Recreation, fishing, and wildlife. Waters suitable for the propagation or support of fish and other aquatic biota, waters that will not adversely affect wildlife in the area, and waters suitable

for boating and swimming. Natural high turbidities in some waters and physical characteristics of banks and streambeds of many streams are factors that limit their value for bathing. Low flows or natural physical and chemical conditions in some waters may limit their value for fish propagation or aquatic biota.

c. Agricultural uses. Waters suitable for irrigation, stock watering, and other agricultural uses, but not suitable for use as a source of domestic supply for the farm unless satisfactory treatment is provided.

d. Industrial water. Waters suitable for industrial purposes, including food processing, after treatment. Treatment may include that necessary for prevention of boiler scale and corrosion.

History: Effective June 1, 2001.
General Authority: NDCC 61-28-04, 61-28-05
Law Implemented: NDCC 23-33, 61-28

33-16-02.1-05. Variances. Upon written application by the responsible discharger, the department finds that by reason of substantial and widespread economic and social impacts the strict enforcement of state water quality criteria is not feasible, the department can permit a variance to the water quality standard for the affected segment. The department can set conditions and time limitations with the intent that progress toward improvements in water quality will be made. This can include interim criteria which must be reviewed at least once every three years. A variance will be granted only after fulfillment of public participation requirements and environmental protection agency approval. A variance will not preclude an existing use.

History: Effective June 1, 2001.
General Authority: NDCC 61-28-04, 61-28-05
Law Implemented: NDCC 23-33, 61-28

33-16-02.1-06. Severability. The rules contained in this chapter are severable. If any rules, or part thereof, or the application of such rules to any person or circumstance are declared invalid, that invalidity does not affect the validity of any remaining portion of this chapter.

History: Effective June 1, 2001.
General Authority: NDCC 61-28-04
Law Implemented: NDCC 23-33, 61-28

33-16-02.1-07. Classification of waters of the state. General. Classification of waters of the state shall be used to maintain and protect the present and future beneficial uses of these waters. Classification of waters of

the state shall be made or changed whenever new or additional data warrant the classification or a change of an existing classification.

History: Effective June 1, 2001.
General Authority: NDCC 61-28-04
Law Implemented: NDCC 23-33, 61-28

33-16-02.1-08. General water quality standards.

1. Narrative standards.

   a. The following minimum conditions are applicable to all waters of the state except for class II ground waters. All waters of the state shall be:

      (1) Free from substances attributable to municipal, industrial, or other discharges or agricultural practices that will cause the formation of putrescent or otherwise objectionable sludge deposits.

      (2) Free from floating debris, oil, scum, and other floating materials attributable to municipal, industrial, or other discharges or agricultural practices in sufficient amounts to be unsightly or deleterious.

      (3) Free from materials attributable to municipal, industrial, or other discharges or agricultural practices producing color, odor, or other conditions to such a degree as to create a nuisance or render any undesirable taste to fish flesh or, in any way, make fish inedible.

      (4) Free from substances attributable to municipal, industrial, or other discharges or agricultural practices in concentrations or combinations which are toxic or harmful to humans, animals, plants, or resident aquatic biota. For surface water, this standard will be enforced in part through appropriate whole effluent toxicity requirements in North Dakota pollutant discharge elimination system permits.

      (5) Free from oil or grease residue attributable to wastewater, which causes a visible film or sheen upon the waters or any discoloration of the surface of adjoining shoreline or causes a sludge or emulsion to be deposited beneath the surface of the water or upon the adjoining shorelines or prevents classified uses of such waters.

   b. There shall be no materials such as garbage, rubbish, offal, trash, cans, bottles, drums, or any unwanted or discarded material disposed of into the waters of the state.

c. There shall be no disposal of livestock or domestic animals in waters of the state.

d. The department shall propose and submit to the state engineer the minimum streamflows of major rivers in the state necessary to protect the public health and welfare. The department's determination shall address the present and prospective future use of the rivers for public water supplies, propagation of fish and aquatic life and wildlife, recreational purposes, and agricultural, industrial, and other legitimate uses.

e. No discharge of pollutants, which alone or in combination with other substances, shall:

(1) Cause a public health hazard or injury to environmental resources;

(2) Impair existing or reasonable beneficial uses of the receiving waters; or

(3) Directly or indirectly cause concentrations of pollutants to exceed applicable standards of the receiving waters.

f. If the department determines that site-specific criteria are necessary and appropriate for the protection of designated uses, procedures described in the environmental protection agency's Water Quality Standards Handbook 1994 or other defensible methods may be utilized to determine maximum limits. Where natural chemical, physical, and biological characteristics result in exceedences of the limits set forth in this section, the department may derive site-specific criteria based on the natural background level or condition. All available information shall be examined, and all possible sources of a contaminant will be identified in determining the naturally occurring concentration. All site-specific criteria shall be noticed for public comment and subjected to other applicable public participation requirements prior to being adopted.

2. Narrative biological goal.

a. Goal. The biological condition of surface waters shall be similar to that of sites or water bodies determined by the department to be regional reference sites.

b. Definitions.

(1) "Assemblage" means an association of aquatic organisms of similar taxonomic classification living in the same area. Examples of assemblages include fish, macroinvertebrates, algae, and vascular plants.

(2) "Aquatic organism" means any plant or animal which lives at least part of its life cycle in water.

(3) "Biological condition" means the taxonomic composition, richness, and functional organization of an assemblage of aquatic organisms at a site or within a water body.

(4) "Functional organization" means the number of species or abundance of organisms within an assemblage which perform the same or similar ecological functions.

(5) "Metric" means an expression of biological community composition, richness, or function which displays a predictable, measurable change in value along a gradient of pollution or other anthropogenic disturbance.

(6) "Regional reference sites" are sites or water bodies which are determined by the department to be representative of sites or water bodies of similar type (e.g., hydrology and ecoregion) and are least impaired with respect to habitat, water quality, watershed land use, and riparian and biological condition.

(7) "Richness" means the absolute number of taxa in an assemblage at a site or within a water body.

(8) "Taxonomic composition" means the identity and abundance of species or taxonomic groupings within an assemblage at a site or within a water body.

c. Implementation. The intent of the state in adopting a narrative biological goal is solely to provide an additional assessment method that can be used to identify impaired surface waters. Regulatory or enforcement actions based solely on a narrative biological goal, such as the development and enforcement of North Dakota pollutant discharge elimination system permit limits, are not authorized. However, adequate and representative biological assessment information may be used in combination with other information to assist in determining whether designated uses are attained and to assist in determining whether new or revised chemical-specific permit limitations may be needed. Implementation will be based on the comparison of current biological conditions at a particular site to the biological conditions deemed attainable based on regional reference sites. In implementing a narrative biological goal, biological condition may

be expressed through an index composed of multiple metrics or through appropriate statistical procedures.

History: Effective June 1, 2001.
General Authority: NDCC 61-28-04
Law Implemented: NDCC 23-33, 61-28

33-16-02.1-09. Surface water classifications, mixing zones, and numeric standards.

1. **Classifications.** Procedures for the classifications of streams and lakes of the state shall follow this subsection. Classifications of streams and lakes are listed in appendix I and appendix II, respectively.

   a. Class I streams. The quality of the waters in this class shall be suitable for the propagation or protection, or both, of resident fish species and other aquatic biota and for swimming, boating, and other water recreation. The quality of the waters shall be suitable for irrigation, stock watering, and wildlife without injurious effects. After treatment consisting of coagulation, settling, filtration, and chlorination, or equivalent treatment processes, the water quality shall meet the bacteriological, physical, and chemical requirements of the department for municipal or domestic use.

   b. Class IA streams. The quality of the waters in this class shall be the same as the quality of class I streams, except that treatment for municipal use may also require softening to meet the drinking water requirements of the department.

   c. Class II streams. The quality of the waters in this class shall be the same as the quality of class I streams, except that additional treatment may be required to meet the drinking water requirements of the department. Streams in this classification may be intermittent in nature which would make these waters of limited value for beneficial uses such as municipal water, fish life, or irrigation.

   d. Class III streams. The quality of the waters in this class shall be suitable for agricultural and industrial uses such as stock watering, irrigation, washing, and cooling. These streams have low average flows and, generally, prolonged periods of no flow. They are of limited seasonal value for immersion recreation, fish life, and aquatic biota. The quality of these waters must be maintained to protect recreation, fish, and aquatic biota.

   e. Wetlands. These water bodies are to be considered waters of the state and will be protected under section 33-16-02-08.

f. Lakes. The type of fishery a lake may be capable of supporting is based on the lake's geophysical characteristics. However, the capability of the lake to support a fishery may be affected by seasonal variations or other natural occurrences which may alter the lake characteristics.

Class	Characteristics
1	Cold water fishery. Waters capable of supporting growth of salmonid fishes and associated aquatic biota.
2	Cool water fishery. Waters capable of supporting growth and propagation of nonsalmonid fishes and marginal growth of salmonid fishes and associated aquatic biota.
3	Warm water fishery. Waters capable of supporting growth and propagation of nonsalmonid fishes and associated aquatic biota.
4	Marginal fishery. Waters capable of supporting a fishery on a seasonal basis.
5	Not capable of supporting a fishery due to high salinity.

2. **Mixing zones.** North Dakota mixing zone and dilution policy is contained in appendix III.

3. **Numeric standards.**

a. Class I streams. Unless stated otherwise, maximum limits for class I streams are listed in table 1 and table 2.

b. Class IA streams. The physical and chemical criteria shall be those for class I, with the following exceptions:

Substance or Characteristic	Maximum Limit
Chlorides (Total)	175 mg/l
Sodium	60% of total cations as mEq/l
Sulfate (Total)	450 mg/l

c. Class II streams. The physical and chemical criteria shall be those for class IA, with the following exceptions:

Substance or Characteristic	Maximum Limit
Chlorides (Total)	250 mg/l

pH	6.0-9.0

d. Class III streams. The physical and chemical criteria shall be those for class II, with the following exceptions:

Substance or Characteristic	Maximum Limit
Sulfate (Total)	750 mg/l

e. Lakes.

(1) The beneficial uses and parameter limitations designated for class I streams shall apply to all classified lakes. However, specific background studies and information may require that the department revise a standard for any specific parameter.

(2) In addition, these nutrient parameters are guidelines for use as goals in any lake improvement or maintenance program:

Parameter	Limit
NO_3 as N	.25 mg/l
PO_4 as P	.02 mg/l

(3) The temperature standard for class I streams does not apply to Nelson Lake in Oliver County. The temperature of any discharge to Nelson Lake shall not have an adverse effect on fish, aquatic life, and wildlife, or Nelson Lake itself.

History: Effective June 1, 2001.
General Authority: NDCC 61-28-04
Law Implemented: NDCC 23-33, 61-28

TABLE 1

MAXIMUM LIMITS FOR SUBSTANCES IN
OR CHARACTERISTICS OF CLASS I STREAMS

CAS No.	Substance or Characteristic	Maximum Limit
		Acute Standard
7446-41-7	Ammonia (Total as N)	The one-hour average concentration of total ammonia (expressed as N in mg/L) does not exceed, more often than once every three years on the average, the numerical value given by the following formula: $\frac{0.411}{1 + 10^{7.204-pH}} + \frac{58.4}{1 + 10^{pH-7.204}}$, where salmonids are absent; or $\frac{0.275}{1 + 10^{7.204-pH}} + \frac{39.0}{1 + 10^{pH-7.204}}$, where salmonids are present.
		Chronic Standard
		The 30-day average concentration of total ammonia (expressed as N in mg/l) does not exceed, more often than once every three years on the average, the numerical value given by the following formula; and the highest 4-day average concentration of total ammonia within the 30-day averaging period does not exceed 2.5 times the numerical value given by the following formula: $= \left(\frac{0.0577}{1 + 10^{7.688-pH}} + \frac{2.487}{1 + 10^{pH-7.688}} \right) \cdot CV$; where CV = 2.85, when T ≤ 14° C; or $CV = 1.45 \cdot 10^{0.028(25-T)}$, when T > 14 ° C.

CAS No.	Substance or Characteristic	Maximum Limit
		Site-Specific Chronic Standard The following site-specific standard applies to the Red River of the North beginning at the 12th Avenue North bridge in Fargo, North Dakota and extending approximately 32 miles downstream to its confluence with the Buffalo River, Minnesota. This site-specific standard applies only during the months of October, November, December, January, and February. During the months of March through September, the statewide chronic ammonia standard applies. The 30-day average concentration of total ammonia (expressed as N in mg/L) does not exceed, more often than once every three years on the average, the numerical value given by the following formula; and the highest 4-day average concentration of total ammonia within the 30-day averaging period does not exceed 2.5 times the numerical value given by the following formula: $= \left(\frac{0.0577}{1 + 10^{7.688-pH}} + \frac{2.487}{1 + 10^{pH-7.688}} \right) \cdot CV$; where CV = 4.63, when T ≤ 7°C; or $CV = 1.45 \cdot 10^{0.028(25-T)}$, when T > 7° C.
7440-39-3	Barium (Total)	1.0 mg/l
	Boron (Total)	.75 mg/l
16887-00-6	Chlorides (Total)	100 mg/l
7.782-50-5	Chlorine Residual (Total)	Acute .019 mg/l Chronic .011 mg/l
7782-44-7	Dissolved Oxygen	not less than 5 mg/l
	Fecal Coliform	200 fecal coliforms per 100 ml. This standard shall apply only during the recreation season May 1 to September 30.
14797-55-8	Nitrates (N) (Diss.)[1]	1.0 mg/l
	pH	7.0-9.0

CAS No.	Substance or Characteristic	Maximum Limit
32730	Phenols (Total)	0.3 mg/l (organoleptic criterion)
7723-14-0	Phosphorus (P) (Total)[1]	0.1 mg/l
	Sodium	50 percent of total cations as mEq/l
	Sulfates (Total as SO_4)	250 mg/l
	Temperature	Eighty-five degrees Fahrenheit [29.44 degrees Celsius]. The maximum increase shall not be greater than five degrees Fahrenheit [2.78 degrees Celsius] above natural background conditions.
	Combined radium 226 and radium 228 (Total)	5 pCi/L
	Gross alpha particle activity, including radium 226, but excluding radon and uranium	15 pCi/L

[1] The standards for nitrates (N) and phosphorus (P) are intended as interim guideline limits. Since each stream or lake has unique characteristics which determine the levels of these constituents that will cause excessive plant growth (eutrophication), the department reserves the right to review these standards after additional study and to set specific limitations on any waters of the state. However, in no case shall the standard for nitrates (N) exceed 10 mg/l for any waters used as a municipal or domestic drinking water supply.

TABLE 2

WATER QUALITY CRITERIA[1]
PRIORITY POLLUTANTS (MICROGRAMS PER LITER)

CAS No.	Pollutant	Aquatic Life Value Classes I,IA,II,III Acute	Chronic	Human Health Value Classes I,IA,II[2]	Class III[3]
83-32-9	Acenaphthene			1200	2700
107-02-8	Acrolein			320	780
107-13-1	Acrylonitrile[4]			0.059	0.66
71-43-2	Benzene[4]			1,2	71
92-87-5	Benzidine[4]			0.00012	0.00054
56-23-5	Carbon tetrachloride[4] (Tetrachloromethane)			0.25	4.4
108-90-7	Chlorobenzene (Monochlorobenzene)			100	21000
120-82-1	1,2,4-Trichlorobenzene			70[7]	940
118-74-1	Hexachlorobenzene[4]			0.00075	0.00077
107-06-2	1,2-Dichloroethane[4]			0.38	99
71-55-6	1,1,1-Trichloroethane			200	
67-72-1	Hexachloroethane[4]			1.9	8.9
79-00-5	1,1,2-Trichloroethane[4]			0.61	42.0
79-34-5	1,1,2,2-Tetrachloroethane[4]			0.17	11.0
111-44-4	Bis(2-chloroethyl) ether[4]			0.031	1.40
91-58-7	2-Chloronaphthalene			1700	4300
88-06-2	2,4,6-Trichlorophenol[4]			2.1	6.5
59-50-7	p-Chloro-m-cresol (4-Chloro-3-methylphenol)			3000	
67-66-3	Chloroform (HM)[4] (Trichloromethane)			5.7	470
95-57-8	2-Chlorophenol			120	400
95-50-1	1,2-Dichlorobenzene[7]			600	17000
541-73-1	1,3-Dichlorobenzene			400	2600
106-46-7	1,4-Dichlorobenzene[7]			75	2600
91-94-1	3,3'-Dichlorobenzidine[4]			0.039	0.077
75-35-4	1,1-Dichloroethylene[4]			0.057	3.2
156-60-5	1,2-trans-Dichloroethylene[7]			100	140000
120-83-2	2,4-Dichlorophenol			93	790
542-75-6	1,3-Dichloropropylene (1,3-Dichloropropene) (cis and trans isomers)			10	1700
78-87-5	1,2-Dichloropropane			.52	39
105-67-9	2,4-Dimethylphenol			540	2300
121-14-2	2,4-Dinitrotoluene[4]			0.11	9.1
122-66-7	1,2-Diphenylhydrazine[4]			0.040	0.54
100-41-4	Ethylbenzene[7]			700	29000
206-44-0	Fluoranthene			300	370
39638-32-9	Bis(2-chloroisopropyl) ether			1400	170000
75-09-2	Methylene chloride (HM)[4] (Dichloromethane)			4.7	1600
74-83-9	Methyl bromide (HM) (Bromomethane)			48	4000

CAS No.	Pollutant	Aquatic Life Value Classes I,IA,II,III Acute	Chronic	Human Health Value Classes I,IA,II[2]	Class III[3]
75-25-2	Bromoform (HM)[5] (Tribromomethane)			4.3	360
75-27-4	Dichlorobromomethane (HM)[5]			0.56	46
124-48-1	Chlorodibromomethane (HM)[5]			0.41	34
87-68-3	Hexachlorobutadiene[4]			0.44	50
77-47-4	Hexachlorocyclopentadiene			50[7]	17000
78-59-1	Isophorone[4]			36	2600
98-95-3	Nitrobenzene			17	1900
51-28-5	2,4-Dinitrophenol			70	14000
534-52-1	4,6-Dinitro-o-cresol (4,6-Dinitro-2-methylphenol)			13	765
62-75-9	N-Nitrosodimethylamine[4]			0.00069	8.1
86-30-6	N-Nitrosodiphenylamine[4]			5.0	16
621-64-7	N-Nitrosodi-n-propylamine[4]			0.005	1.4
87-86-5	Pentachlorophenol	19	15	0.28	8.2
108-95-2	Phenol			21000	4600000
117-81-7	Bis(2-ethylhexyl)phthalate[4]			1.8	5.9
85-68-7	Butyl benzyl phthalate			3000	5200
84-74-2	Di-n-butyl phthlate			2700	12000
84-66-2	Diethyl phthalate			23000	120000
131-11-3	Dimethyl phthlate			313000	2900000
56-55-3	Benzo(a)anthracene (PAH)[4] (1,2-Benzanthracene)			0.0044	0.049
50-32-8	Benzo(a)pyrene (PAH)[4] (3,4-Benzopyrene)			0.0044	0.049
205-99-2	Benzo(b)fluoranthene (PAH)[4] (3,4-Benzofluoranthene)			0.0044	0.049
207-08-9	Benzo(k)fluoranthene (PAH)[4] (11,12-Benzofluoranthene)			0.0044	0.049
218-01-9	Chrysene (PAH)[4]			0.0044	0.049
120-12-7	Anthracene (PAH)[5]			9600	110000
86-73-7	Fluorene (PAH)[5]			1300	14000
53-70-1	Dibenzo(a,h)anthracene (PAH)[4] (1,2,5,6-Dibenzanthracene)			0.0044	0.049
193-39-5	Indeno(1,2,3-cd)pyrene (PAH)[4]			0.0044	0.049
129-00-0	Pyrene (PAH)[5]			960	11000
127-18-4	Tetrachloroethylene[4]			0.8	8.9
108-88-3	Toluene			10007	200000
79-01-6	Trichloroethylene[4]			2.7	81
75-01-4	Vinyl chloride[4] (Clorоethylene)			2	530
309-00-2	Aldrin[4]	1.5		0.00013	0.00014
60-57-1	Dieldrin[4]	1.25	0.56	0.00014	0.00014
57-74-9	Chlordane[4]	1.2	0.0043	0.0021	0.0022
80-29-3	4,4'-DDT[4]	0.55	0.001	0.00059	0.00059
75-55-9	4,4'-DDE[4]			0.00059	0.00059
72-54-8	4,4'-DDD[4]			0.00083	0.00084
115-29-7	alpha-Endosulfan	0.11	0.056	110	240
115-29-7	beta-Endosulfan	0.11	0.05	110	240
1031-07-8	Endosulfan sulfate			110	240
72-20-8	Endrin	0.09	0.036	0.76	0.81
7421-93-4	Endrin aldehyde			0.76	0.81
76-44-8	Heptachlor[4]	0.26	0.0038	0.00021	0.00021
1024-57-3	Heptachlor epoxide[4]	0.26	0.0038	0.00010	0.00011

CAS No.	Pollutant	Aquatic Life Value Classes I,IA,II,III Acute	Chronic	Human Health Value Classes I,IA,II[2]	Class III[2]
319-84-6	alpha-BHC[4] (Hexachlorocyclohexane-alpha)			0.0039	0.013
319-85-7	beta-BHC[4] (Hexachlorocyclohexane-beta)			0.014	0.046
58-89-9	gamma-BHC (Lindane)[4] (Hexachlorocyclohexane-gamma)	0.95		0.019	0.063
319-86-8	delta-BHC[4] (Hexachlorocyclohexane-delta)				
1336-36-3	PCB 1242 (Arochlor 1242)[4]		0.014	0.00017	0.00017
1336-36-3	PCB-1254 (Arochlor 1254)[4]		0.014	0.00017	0.00017
1336-36-3	PCB-1221 (Arochlor 1221)[4]		0.014	0.00017	0.00017
1336-36-3	PCB-1232 (Arochlor 1232)[4]		0.014	0.00017	0.00017
1336-36-3	PCB-1248 (Arochlor 1248)[4]		0.014	0.00017	0.00017
1336-36-3	PCB-1260 (Arochlor 1260)[4]		0.014	0.00017	0.00017
1336-36-3	PCB-1016 (Arochlor 1016)[4]		0.014	0.00017	0.00017
8001-35-2	Toxaphene[4]	0.73	0.0002	0.00073	0.00075
7440-36-0	Antimony			6	4300
7440-38-2	Arsenic[4,7]	340	150	50[7]	
1332-21-4	Asbestos[4]				7000000 f/l
7440-41-7	Beryllium[4]			4[7]	
7440-43-9	Cadmium	4.5[6]	2.5[6]	5[7]	
7440-47-3	Chromium (III)	1800[6]	86[6]	100(total)	
	Chromium (VI)	16	11	100(total)[7]	
7440-50-8	Copper	7.9[6]	9.3[6]	1000	
57-12-5	Cyanide (total)	22	5.2	200[7]	220000
7439-92-1	Lead	82[6]	3.2[6]	15[7]	
7439-97-6	Mercury	1.7	0.91	0.050	0.051
7440-02-0	Nickel	470[6]	52[6]	100[7]	4600
7782-49-2	Selenium	20	5	50[7]	
7440-22-4	Silver	4.1[6]			
7440-28-0	Thallium			1.7	6.2
7440-66-6	Zinc	120[6]	120[6]	9100	69000
1746-01-6	Dioxin (2,3,7,8-TCDD)[4]			0.000000013	0.000000014
15972-60-8	Alachlor			2[7]	
1912-24-9	Atrazine			3[7]	
1563-66-2	Carbofuran			40[7]	
94-75-7	2,4-D			70[7]	
75-99-0	Dalapon			200[7]	
103-23-1	Di(2-ethylhexyl)adipate			400[7]	
96-12-8	Dibromochloropropane			0.2[7]	
156-59-2	Dichloroethylene (cis-1,2-)			70[7]	
88-85-7	Dinoseb			7[7]	
85-00-7	Diquat			20[7]	
145-73-3	Endothall			100[7]	
106-93-4	Ethylene dibromide (EDB)			0.05[7]	
107-83-6	Glyphosate			700[7]	
72-43-5	Methoxychlor			40[7]	
23135-22-0	Oxamyl (Vydate)			200[7]	
1918-02-1	Picloram			500[7]	
122-34-9	Simazine			4[7]	
100-42-5	Styrene			100[7]	
1330-20-7	Xylenes			10,000[7]	
7782-41-4	Fluoride			4,000[7]	
14797-65-0	Nitrite			1,000[7]	
12587-47-2	Beta/photon emitters			4 mrem/yr[7]	

CAS No. Chemical Abstracts Service Registry Number

[1] Except for the aquatic life values for metals, the values given in this appendix refer to the total (dissolved plus suspended) amount of each substance. For the aquatic life values for metals, the values refer to the total recoverable method for ambient metals analyses.

[2] Based on two routes of exposure - ingestion of contaminated aquatic organisms and drinking water.

[3] Based on one route of exposure - ingestion of contaminated aquatic organisms only.

[4] Substance classified as a carcinogen, with the value based on an incremental risk of one additional instance of cancer in one million persons.

[5] Chemicals which are not individually classified as carcinogens but which are contained within a class of chemicals, with carcinogenicity as the basis for the criteria derivation for that class of chemicals; an individual carcinogenicity assessment for these chemicals is pending.

[6] Hardness dependent criteria. Value given is an example only and is based on a $CaCO_3$ hardness of 100 mg/l. Criteria for each case must be calculated using the following formula:

CMC = exp (ma [ln (hardness)] + ba)

	ma	ba
Cadmium	1.128	-3.6867
Copper	0.9422	-1.700
Chromium (III)	0.8190	3.7256
Lead	1.273	-1.460
Nickel	0.8460	2.255
Silver	1.72	- 6.52
Zinc	0.8473	0.884

CMC = Criterion Maximum Concentration (acute exposure value)
The threshold value at or below which there should be no unacceptable effects to freshwater aquatic organisms and their uses if the one-hour concentration does not exceed that CMC value more than once every three years on the average.

CCC = exp (mc [ln (hardness)] + bc)

	mc	bc
Cadmium	0.7852	-2.715
Copper	0.8545	-1.702
Chromium	0.8190	0.6848
Lead	1.273	- 4.705
Nickel	0.8460	0.0584
Silver	----	----
Zinc	0.8473	0.884

CCC = Criterion Continuous Concentration (chronic exposure value)
The threshold value at or below which there should be no unacceptable effects to freshwater aquatic organisms and their uses if the four-day concentration does not exceed that CCC value more than once every three years on the average.

[7] Safe Drinking Water Act (MCL).

[8] pH dependent criteria. Value given is an example only and is based on a pH of 7.8. Criteria for each case must be calculated using the following formula:

Freshwater aquatic life criteria for pentachlorophenol are expressed as a function of pH. Values displayed in the table correspond to a pH of 7.8 and are calculated as follows:

CMC = exp [1.005 (pH) - 4.869] CCC = exp [1.005 (pH) - 5.134]

33-16-02.1-10. Ground water classifications and standards.

1. Class I ground waters. Class I ground waters shall have a total dissolved solids concentration of less than 10,000 mg/l. Class I ground waters are not exempt under the North Dakota underground injection control program in section 33-25-01-08.

2. Class II ground waters. Class II ground waters shall have a total dissolved solids concentration of 10,000 mg/l or greater. Class II ground waters are exempt under the North Dakota underground injection control program in section 33-25-01-08.

History: Effective June 1, 2001.
General Authority: NDCC 61-28-04, 61-28-05
Law Implemented: NDCC 61-28-04

33-16-02.1-11. Discharge of wastes. On-surface discharges. The following are general requirements for all waste discharges:

1. No untreated domestic sewage shall be discharged into the waters of the state.

2. No untreated industrial wastes or other wastes which contain substances or organisms which may endanger public health or degrade the water quality of water usage shall be discharged into the waters of the state.

3. The degree of treatment for municipal wastes shall be that required by the department and shall be based on the following:

   a. Wastes are to receive a minimum of secondary treatment or equivalent which shall be equal to at least an eighty-five percent removal of five-day biochemical oxygen demand, or shall meet the effluent standards noted in subdivision c. The more restrictive requirements shall apply.

   b. Wastes shall be effectively disinfected before discharge into state waters if such discharges cause violation of the fecal coliform criteria as set forth in these standards.

   c. No waste discharge shall be permitted unless the effluent meets the following criteria:

      (1) Five-day biochemical oxygen demand: 25 mg/l consecutive thirty-day average.

      (2) Suspended solids: 30 mg/l consecutive thirty-day average.

      (3) Fecal coliform: Fecal coliform not to exceed 200 colonies/100 ml consecutive thirty-day geometric mean.

      In certain instances, external circumstances or specific uses of the receiving waters make either attainment or application of the suspended solids or fecal coliform limitations an ineffective means of controlling water quality. For this

reason, the department reserves the right to evaluate the application of these limitations on a case-by-case basis.

(4) pH: 6.0-9.0.

Natural ground waters and surface waters in some parts of the state presently used for water supplies with or without treatment are basic and the stabilization process of wastewater treatment in lagoon systems can result in more alkaline (increased pH) water. Discharges from waste treatment facilities may exceed the upper pH limit due to these uncontrollable properties. Approval to discharge may be granted providing the pH of the receiving water is not violated.

d. The department may require treatment in addition to that listed in this section if such waste discharges, made during low stream flows, cause violations of stream water quality standards or have a detrimental effect on the beneficial uses of the receiving waters.

4. Industrial waste effluents shall meet all parameters of quality as set forth under the North Dakota pollutant discharge elimination system and shall not violate North Dakota water quality standards.

5. The department must be notified at least twenty days prior to the application of any herbicide or pesticide to surface waters of the state for control of aquatic pests. The notification must include the following information:

a. Chemical name and composition.

b. Map which identifies the area of application and number of square feet.

c. A list of target species of aquatic biota the applicant desires to control.

d. The calculated concentration of the active ingredient in surface waters immediately after application.

e. Name, address, and telephone number of the certified applicator.

6. Any spill or discharge of waste which causes or is likely to cause pollution of waters of the state must be reported immediately. The owner, operator, or person responsible for a spill or discharge must notify the department as soon as possible (701-328-5210) or the North Dakota hazardous materials emergency assistance and spill reporting number (1-800-472-2121) and provide all relevant information about

the spill. Depending on the severity of the spill or accidental discharge, the department may require the owner or operator to:

a. Take immediate remedial measures;

b. Determine the extent of pollution to waters of the state;

c. Provide alternate water sources to water users impacted by the spill or accidental discharge; or

d. Any other actions necessary to comply with this chapter.

History: Effective June 1, 2001.
General Authority: NDCC 61-28-04
Law Implemented: NDCC 23-33, 61-28

APPENDIX I

STREAM CLASSIFICATIONS

The following intrastate and interstate streams are classified as the class of water quality which is to be maintained in the specified stream or segments noted. There are a number of minor or intermittently flowing watercourses, unnamed creeks, or draws, etc., which are not listed. All tributaries not specifically mentioned are classified as Class III streams.

RIVER BASINS, SUBBASINS, AND TRIBUTARIES	CLASSIFICATION
Missouri River, including Lake Sakakawea and Oahe Reservoir	I
Yellowstone	I
Little Muddy Creek near Williston	II
White Earth River	II
Little Missouri River	II
Knife River	II
Spring Creek	IA
Square Butte Creek below Nelson Lake	IA
Heart River	IA
Green River	IA
Antelope Creek	II
Muddy Creek	II
Apple Creek	II
Cannonball River	II
Cedar Creek	II
Beaver Creek near Linton	II
Grand River	IA
Spring Creek	II
Souris River	IA
Des Lacs River	II
Willow Creek	II
Deep River	III
Mauvais Coulee	I
James River	IA
Pipestem	IA
Cottonwood Creek	II

RIVER BASINS, SUBBASINS, AND TRIBUTARIES	CLASSIFICATION
Beaver Creek	II
Elm River	II
Maple River	II
Bois de Sioux	I
Red River	I
Wild Rice River	II
Antelope Creek	III
Sheyenne River	IA
Baldhill Creek	II
Maple River	II
Rush River	III
Elm River	II
Goose River	IA
Turtle River	II
Forest River	II
North Branch	III
Park River	II
North Branch	III
South Branch	II
Middle Branch	III
Cart Creek	III
Pembina River	IA
Tongue River	II

APPENDIX II

LAKE CLASSIFICATION

Lakes are classified according to the water characteristics which are to be maintained in the specified lakes. The beneficial water uses and parameter limitations designated for Class I streams shall apply to all classified lakes.

COUNTY	LAKE	CLASSIFICATION
Adams	Mirror	3
Adams	N. Lemmon	1
Barnes	Ashtabula	3
Barnes	Heinze	3
Barnes	Moon	2
Barnes	Clausen Spring	1
Benson	Wood Lake	2
Benson	Graves	3
Benson	Reeves	3
Bottineau	Metigoshe	2
Bottineau	Long Lake	2
Bottineau	Pelican	3
Bottineau	Carbury	2
Bottineau	Cassidy	3
Bottineau	Strawberry	2
Bowman	Bowman-Haley	3
Bowman	Gascoyne	3
Bowman	Kalina	3
Bowman	Spring Lake	3
Burke	Powers Lake	3

COUNTY	LAKE	CLASSIFICATION
Burke	Short Creek	2
Burke	Smishek	2
Burke	Truax Mine	1
Burke	Northgate	2
Burke	Bowbells Mine	1
Burleigh	McDowell Dam	3
Burleigh	New Johns Lake	2
Cass	Casseton Reservoir	3
Cass	Hunter Dam	3
Cass	Brewer Lake	2
Cavalier	Mt. Carmel	2
Dickey	Moores Lake	1
Dickey	Pheasant	3
Dickey	Wilson Dam	3
Divide	Skjermo	2
Dunn	Lake Ilo	3
Eddy	Warsing Dam	2
Emmons	Braddock Dam	3
Emmons	Nieuwsma Dam	2
Emmons	Rice Lake	4
Emmons	Welk Dam	3
Foster	Juanita	3
Golden Valley	Camel Hump	1
Golden Valley	Odland Dam	3
Golden Valley	Williams Creek	4
Grand Forks	Fordville	2
Grand Forks	Larimore	2
Grand Forks	Kolding	2

COUNTY	LAKE	CLASSIFICATION
Grant	Tschida	2
Grant	Raleigh Reservoir	4
Grant	Sheep Creek	2
Griggs	Red Willow	3
Griggs	Carlson-Tande	3
Hettinger	Larson Lake	3
Hettinger	Kilzer	3
Hettinger	Castle Rock	1
Hettinger	Indian Creek	3
Hettinger	Mott Dam	2
Hettinger	Blickensderfer	2
Kidder	Cherry Lake	2
Kidder	Crystal Springs	3
Kidder	Frettum Lake	2
Kidder	Round Lake	2
Kidder	Lake Williams	2
Kidder	Lake Isabel	3
Kidder	George Lake	5
LaMoure	Schlec-Weix.	3
LaMoure	Hein.-Martin	2
LaMoure	Kulm-Edgeley	2
LaMoure	Cottonwood	4
LaMoure	Kaimbach	4
LaMoure	Schlec-Thom	2
LaMoure	Lake LaMoure	2
Logan	Beaver Lake	3
Logan	Mundt Lake	2
Logan	Rudolph Lake	4

COUNTY	LAKE	CLASSIFICATION
McHenry	Cottonwood	3
McHenry	George Lake	2
McHenry	Round Lake	3
McHenry	Buffalo Lodge	3
McIntosh	Blumhardt	1
McIntosh	Coldwater	2
McIntosh	Green Lake	2
McIntosh	Lake Hoskins	2
McIntosh	Clear Lake	2
McKenzie	Arnegard Dam	4
McKenzie	Sather Dam	2
McLean	Brush Lake	3
McLean	W. Park Lake	2
McLean	E. Park Lake	2
McLean	Brekken	2
McLean	Holmes	2
McLean	Lightning	2
McLean	Crooked Lake	2
McLean	Custer Mine	1
McLean	Audubon	2
McLean	Strawberry	3
McLean	Long Lake	4
McLean	Riv. Spillway	1
Morton	Crown Butte	3
Morton	Fish Creek	1
Morton	Sweetbriar	3
Morton	Nygren	3
Morton	Danzig	3

COUNTY	LAKE	CLASSIFICATION
Mountrail	Clearwater	3
Mountrail	White Earth	2
Mountrail	Stanley Reservoir	3
Nelson	McVille Dam	1
Nelson	Whitman Dam	1
Nelson	Tolna Dam	2
Oliver	Nelson Lake	3
Oliver	Van Oosting	3
Oliver	M. Mosbrucker	2
Oliver	A. Mosbrucker	1
Oliver	E. Arroda Lake	1
Oliver	W. Arroda Lake	1
Pembina	Renwick Dam	2
Pierce	Balta Dam	2
Pierce	Buffalo Lake	2
Ramsey	Devils Lake	3
Ramsey	Cavanaugh	3
Ransom	Dead Colt Creek	3
Renville	Lake Darling	2
Richland	Lake Elsie	2
Richland	Mooreton Pond	2
Rolette	Carpenter	2
Rolette	Dion Lake	2
Rolette	Gravel Lake	1
Rolette	Gordon	2
Rolette	Hooker Lake	1
Rolette	Belcourt	2
Rolette	School Section	2

COUNTY	LAKE	CLASSIFICATION
Rolette	Upsilon	3
Rolette	Shutte Lake	2
Sargent	Alkali Lake	3
Sargent	Silver Lake	2
Sargent	Tewaukon	3
Sargent	Buffalo Lake	4
Sargent	Sprague Lake	3
Sheridan	Hecker	2
Sheridan	S. McClusky	2
Sioux	Froelich	2
Slope	Cedar Lake	3
Slope	Davis Dam	1
Slope	Hamann Dam	1
Slope	Stewart Lake	3
Stark	Patterson	3
Stark	Dickinson Dike	2
Stark	Belfield Pond	3
Steele	N. Tobiason	3
Steele	Golden Lake	3
Steele	N. Golden Lake	3
Stutsman	Jamestown Reservoir	2
Stutsman	Clark Lake	3
Stutsman	Jim Lake	3
Stutsman	Spiritwood	2
Stutsman	Arrowwood	4
Stutsman	Krapp Dam	2
Stutsman	Barnes Lake	3
Stutsman	Pipestem Reservoir	3

COUNTY	LAKE	CLASSIFICATION
Towner	Armourdale	2
Walsh	Matejcek	1
Walsh	Bylin Dam	2
Walsh	Homme Dam	2
Ward	Nelson-Carlson	2
Ward	Rice Lake	2
Ward	Velva Sptsm.	1
Wells	Harvey Dam	3
Wells	Lake Hiawatha	4
Williams	Blacktail	3
Williams	Epp.-Springbrook	2
Williams	Iverson	2
Williams	Kota-Ray	1
Williams	McCloud	3
Williams	McGregor	1
Williams	Tioga Reservoir	2

COUNTY	LAKE	CLASSIFICATION
Williams	Williston Park	4
Williams	Cottonwood	3
	Oahe	1
	Sakakawea	1

APPENDIX III

MIXING ZONE AND DILUTION POLICY
AND
IMPLEMENTATION PROCEDURE

PURPOSE

This policy addresses how mixing and dilution of point source discharges with receiving waters will be addressed in developing chemical-specific and whole effluent toxicity discharge limitations for point source discharges. Depending upon site-specific mixing patterns and environmental concerns, some pollutants/criteria may be allowed a mixing zone or dilution while others may not. In all cases, mixing zone and dilution allowances shall be limited, as necessary, to protect the integrity of the receiving water's ecosystem and designated uses.

MIXING ZONES

Where dilution is available and the discharge does not mix at a near instantaneous and complete rate with the receiving water (incomplete mixing), an appropriate mixing zone may be designated. In addition, a mixing zone may only be designated if it is not possible to achieve chemical-specific standards and whole effluent toxicity objectives at the end-of-pipe with no allowance for dilution. The size and shape of a mixing zone will be determined on a case-by-case basis. At a maximum, mixing zones for streams and rivers shall not exceed one-half the cross-sectional area or a length 10 times the stream width at critical low flows, whichever is more limiting. Also, at a maximum, mixing zones in lakes shall not exceed 5 percent of lake surface area or 200 feet in radius, whichever is more limiting. Individual mixing zones may be limited or denied in consideration of designated beneficial uses or presence of the following concerns in the area affected by the discharge:

1) There is the potential for bioaccumulation in fish tissues or wildlife.
2) The area is biologically important, such as fish spawning/nursery areas.
3) The pollutant of concern exhibits a low acute to chronic ratio.
4) There is a potential for human exposure to pollutants resulting from drinking water use or recreational activities.
5) The effluent and resultant mixing zone results in an attraction of aquatic life to the effluent plume.
6) The pollutant of concern is extremely toxic and persistent in the environment.
7) The mixing zone would prohibit a zone of passage for migrating fish or other species (including access to tributaries).
8) There are cumulative effects of multiple discharges and their mixing zones.

Within the mixing zone designated for a particular pollutant, certain numeric water quality criteria for that substance may not apply. However, all mixing zones shall meet the general conditions set forth in Section 33-16-02-08 of the State Water Quality Standards.

While exceedences of acute chemical specific numeric standards are not allowed within the entire mixing zone, a portion of the mixing zone (the zone of initial dilution or ZID) may exceed acute chemical-specific numeric standards established for the protection of aquatic life. The ZID shall be determined on a case-by-case basis where the statement of basis for the discharge permit includes a rationale for concluding that a zone of initial dilution poses no unacceptable risks to aquatic life. Acute whole effluent toxicity (WET) limits shall be achieved at the end-of-pipe with no allowance for a ZID.

DILUTION ALLOWANCES

An appropriate dilution allowance may be provided in calculating chemical-specific acute and chronic and WET discharge limitations where: 1) the discharge is to a river or stream, 2) dilution is available at low-flow conditions, and 3) available information is sufficient to reasonably conclude that there is near instantaneous and complete mixing of the discharge with the receiving water (complete mixing). The basis for concluding that such near instantaneous and complete mixing is occurring shall be documented in the statement of basis for the NDPDES permit. In the case of field studies, the dilution allowance for continuous dischargers shall be based on the critical low flow (or some portion of the critical low flow). The requirements and environmental concerns identified in the paragraphs above may be considered in deciding the portion of the critical low flow to provide as dilution. The following critical low flows shall be used for streams and effluents:

Stream Flows	
Aquatic life, chronic	4-day, 3-year flow (biologically based*)**
Aquatic life, acute	1-day, 3-year flow (biologically based)
Human health (carcinogens)	harmonic mean flow
Human health (non-carcinogens)	4-day, 3-year flow (biologically based) or 1-day, 3-year flow (biologically based)
Effluent Flows	
Aquatic life, chronic	Mean daily flow
Aquatic life, acute	Maximum daily flow
Human health (all)	Mean daily flow

* Biologically based refers to the biologically based design flow method developed by EPA. It differs from the hydrologically based design flow method in that it directly uses the averaging periods and frequencies specified in the aquatic life water quality criteria for individual pollutants and whole effluents for determining design flows.

** A 30-day, 10-year flow (biologically based) can be used for ammonia or other chronic standard with a 30-day averaging period.

For chemical-specific and chronic WET limits, an appropriate dilution allowance may also be provided for certain minor publicly owned treatment works (POTWs) where allowing such dilution will pose insignificant environmental risks. For acute WET limits, an allowance for dilution is authorized only where dilution is available and mixing is complete.

For controlled discharges, such as lagoon facilities that discharge during high ambient flows, the stream flow to be used in the mixing zone analysis should be the lowest statistical flow expected to occur during the period of discharge.

Where a discharger has installed a diffuser in the receiving water, all or a portion of the critical low stream flow may be provided as a dilution allowance. The determination shall depend on the diffuser design and on the requirements and potential environmental concerns identified in the above paragraphs. Where a diffuser is installed across the

entire river/stream width (at critical low flow), it will generally be presumed that near instantaneous and complete mixing is achieved and that providing the entire critical low flow as dilution is appropriate.

OTHER CONSIDERATIONS

Where dilution flow is not available at critical conditions (i.e., the water body is dry), the discharge limits will be based on achieving applicable water quality criteria (i.e., narrative and numeric, chronic and acute) at the end-of-pipe; neither a mixing zone or an allowance for dilution will be provided.

All mixing zone dilution assumptions are subject to review and revision as information on the nature and impacts of the discharge becomes available (e.g., chemical or biological monitoring at the mixing zone boundary). At a minimum, mixing zone and dilution decisions are subject to review and revision, along with all other aspects of the discharge permit upon expiration of the permit.

For certain pollutants (e.g., ammonia, dissolved oxygen, metals) that may exhibit increased toxicity or other effects on water quality after dilution and complete mixing is achieved, the waste load allocation shall address such effects on water quality, as necessary, to fully protect designated and existing uses. In other words, the point of compliance may be something other than the mixing zone boundary or the point where complete mixing is achieved.

The discharge will be consistent with the Antidegradation Procedure.

Step 4 - Site-Specific Risk Considerations

Where allowing a mixing zone or a dilution allowance would pose unacceptable environmental risks, the discharge limitations will be based on achieving applicable narrative and numeric water quality criteria at the end-of-pipe. The existence of environmental risks may also be the basis for a site-specific mixing zone or dilution allowance. Such risk determinations will be made on a case-by-case and parameter-by-parameter basis. These decisions will take into account the designated and existing uses and all relevant site-specific environmental concerns, including the following:

1. Bioaccummulation in fish tissues or wildlife
2. Biologically important areas such as fish spawning areas
3. Low acute to chronic ratio
4. Potential human exposure to pollutants resulting from drinking water or recreational areas
5. Attraction of aquatic life to the effluent plume
6. Toxicity/persistence of the substance discharged
7. Zone of passage for migrating fish or other species (including access to tributaries)
8. Cumulative effects of multiple discharges and mixing zones

Step 5 - Complete Mix Procedures

For point source discharges to rivers/streams where available data are adequate to support a conclusion that there is near instantaneous and complete mixing of the discharge with the receiving water (complete mix) the full critical low flow or a portion thereof may be provided as dilution for chemical-specific and WET limitations. Such determinations of complete mixing will be made on a case-by-case basis using best professional judgement. Presence of an effluent diffuser that covers the entire river/stream width at critical low flow will generally be assumed to provide complete mixing. Also, where the mean daily flow of the discharge exceeds the chronic low stream flow of the receiving water, complete mixing will generally be assumed. In addition, where the mean daily flow of the discharge is less than or equal to the chronic low flow of the receiving water, it will generally be assumed that complete mixing does not occur unless otherwise demonstrated by the permittee. Demonstrations for complete mixing should be consistent with the study plan developed in cooperation with the states/tribes and EPA Region VIII. Near instantaneous and complete mixing is defined as no more than a 10 percent difference in bank-to-bank concentrations within a longitudinal distance not greater than two river/stream widths. For controlled discharges (lagoon facilities), the test of near instantaneous and complete mixing will be made using the expected rate of effluent discharge and the lowest upstream flow expected to occur during the period of discharge.

The following critical low flows shall be applied for streams and effluents:

Stream Flows	
Aquatic life, chronic	4-day, 3-year flow (biologically based*)**
Aquatic life, acute	1-day, 3-year flow (biologically-based)
Human health (carcinogens)	Harmonic mean flow
Human health (non-carcinogens)	4-day, 3-year flow (biologically-based) or 1-day, 3-year flow (biologically-based)
Effluent Flows	
Aquatic life, chronic	Mean daily flow
Aquatic life, acute	Maximum daily flow
Human health (all)	Mean daily flow

* Biologically based refers to the biologically based design flow method developed by EPA. It differs from the hydrologically based design flow method in that it directly uses the averaging periods and frequencies specified in the aquatic life water quality criteria for individual pollutants and whole effluents for determining design flows.

** A 30-day, 10-year flow (biologically based) can be used for ammonia or other chronic standard with a 30-day averaging period.

Where complete mixing can be concluded and the environmental concerns identified in step 4 do not justify denying dilution, but are nevertheless significant, some portion of the critical low flows identified above may be provided as dilution. Such decisions will take site-specific environmental concerns into account as necessary to ensure adequate protection of designated and existing uses.

Step 6 - Incomplete Mix Procedures

This step addresses point source discharges that exhibit incomplete mixing. Because acute WET limits are achieved at the end-of-pipe in incomplete mix situations, this step provides mixing zone procedures for chronic aquatic life, human health, and WET limits, and ZID procedures for acute chemical-specific limits. Where a ZID is allowed for chemical limits, the size of the ZID shall be limited as follows:

Lakes:	The ZID volume shall not exceed 10 percent of the volume of the chronic mixing zone.
Rivers and Streams:	The ZID shall not exceed 10 percent of the chronic mixing zone volume or flow, nor shall the ZID exceed a maximum downstream length of 100 feet, whichever is more restrictive.

The following provides guidelines for determining the amount of dilution available for dischargers that exhibit incomplete mixing.

Default Method

This method addresses situations where information needed for modeling is not available or there are concerns about potential environmental impacts of allowing a mixing zone. The default method provides a conservative dilution allowance.

Stream/River Dischargers: Dilution calculation which uses up to 10 percent of the critical low flow for chronic aquatic life limits or human health limits. However, this allowance may be adjusted downward on a case-by-case basis depending upon relevant site-specific information, designed and existing uses of the segment, and especially the uses of the segment portion affected by the discharge.

Lake/Reservoir Dischargers: Dilution up to 4:1 ratio (20 percent effluent) may be provided for chronic aquatic life analyses or human health analyses. However, this allowance may be adjusted downward on a case-by-case basis depending upon discharge flow, lake size, lake flushing potential, designated and existing uses of the lake, and uses of the lake portion affected by the discharge.

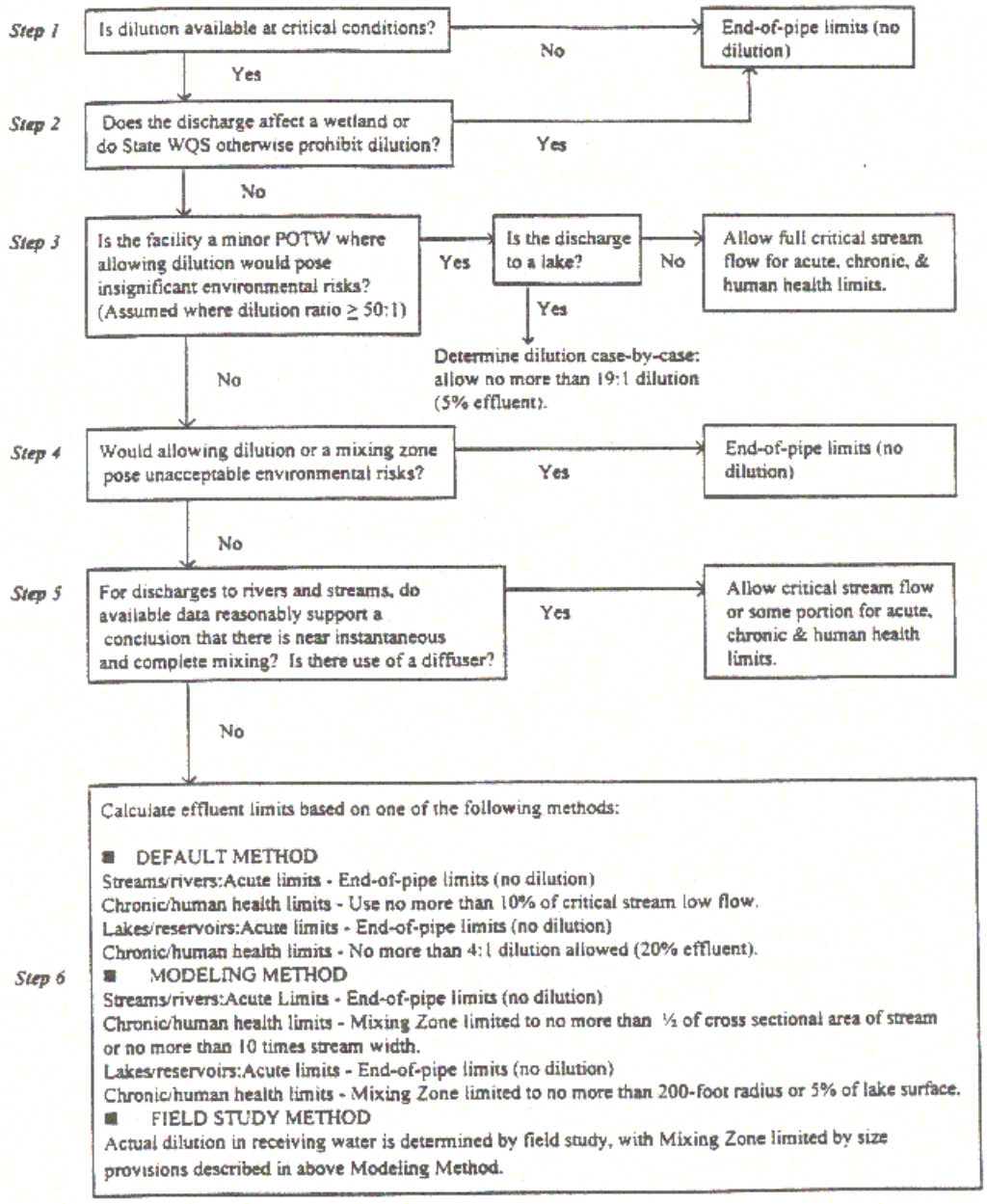
Modeling Method

An appropriate mixing zone model is used to calculate the dilution flow that will allow mixing zone limits to be achieved at the critical low flow. Prior to initiating modeling studies, it should be determined that compliance with criteria at the end-of-pipe is not practicable.

Field Study Method

Field studies which document the actual mixing characteristics in the receiving water are used to determine the dilution flow that will allow mixing zone size limits to be achieved at the critical low flow. For the purposes of field studies, "near instantaneous and complete mixing" is operationally defined as no more than a 10 percent difference in bank-to-bank concentrations within a longitudinal distance not greater than two stream/river widths.

FIGURE 1
NORTH DAKOTA MODEL MIXING ZONE/DILUTION PROCEDURE*



* This procedure is applied to both chemical-specific and WET limits. In the case of complex discharges, the dilution or mixing zone may vary parameter-by-parameter.